Service Manual

30D QFM™

Quick Fork Mount Push/Pull

Serial Numbers 677190 through 677192

Manual Number 678535

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Contents

	Page Number
INTRODUCTION, Section 1	1
INSTALLATION INSTRUCTIONS, Section 2	1
Truck Requirements	1
Installation	2
Prior to Installation	2
Initial Installation	3
Prior to Operation	5
PERIODIC MAINTENANCE, Section 3	5
TROUBLESHOOTING, Section 4	6
General Procedures	6
Truck System Requirements	6
Tools Required	6
Get All the Facts	6
Plumbing	7
Hosing Diagram	7
Circuit Schematic	7
Push/Pull Circuit	8
SERVICE, Section 5	9
Attachment Removal and Installation	9
Faceplate and Linkage	10
Disassembly and Reassembly	10
Link Service	12
Hose Installation	13
Valve	14
Removal and Installation	14
Disassembly and Service	14
Cylinders	15
Gripper Cylinder Removal and Installation	15
Push/Pull Cylinder Removal and Installation	15
Push/Pull Cylinder Adjustment	16
General Cylinder Service Procedures	17
Gripper Cylinder Service	18
Push/Pull Cylinder Service	18
Platens	19
Removal and Installation	19
Inspection	19
SPECIFICATIONS, Section 6	20
Hydraulics	20
Truck Carriage	20
Torque Values	21

Section 1 Introduction

This manual provides the installation instructions, periodic maintenance requirements, troubleshooting procedures and service guides for 30D QFM™ Quick Fork Mount Push/Pulls. Note that all specifications are shown in US and (Metric) units where applicable.

1.1 Special Instruction Definitions

⚠ WARNING

A statement preceded by **⚠ WARNING** is information that should be acted upon to prevent **bodily injury.** A **WARNING** is always inside a ruled box.

CAUTION

A statement preceded by **CAUTION** is information that should be acted upon to prevent **machine damage**.

IMPORTANT

A statement preceded by **IMPORTANT** is information that possesses special significance.

NOTE

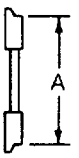
A statement preceded by **NOTE** is information that is handy to know and may make your job easier.

Section 2 Installation Instructions

2.1 Truck Requirements

- **WARNING:** The QFM™ Push/Pull must be mounted on standard forks to support the load and the attachment.
- **Sideshifter Limitations:** To avoid mounting interference, the sideshifter components and cylinder must not protrude in front of the carriage fork bars.
- **Fork Specifications:** Forks up to 1.8 in. (4.5 cm) thick and 40-46 in. (101-116 cm) long may be used. Recommended fork length is 42 in. (106 cm) with bottom taper. The forks must be adjustable to 22.5-25.5 in. (57-64 cm) between the inner edges of the forks.
- Truck carriage or sideshifter carriage must conform to ISO dimensional standard 2328, equivalent to Industrial Truck Association (ITA) dimensions shown at right.
- Make sure the truck carriage is clean and the notches are undamaged.
- In order to conform to industry standard practice, the hoses should be connected to the truck auxiliary valve as indicated in the chart at right.
- Truck Relief Valve Setting: 2300 psi (160 bar), maximum.
- Hydraulic flow: 4-10 GPM (15L/min-38L/min).
- Recommended hose and fitting size: No. 6 with minimum fitting orifices of 3/8 in. (9.5 mm).

WARNING: Rated capacity of the truck/attachment combination is a responsibility of the original truck manufacturer and may be less than that shown on the attachment nameplate. Consult the truck nameplate.



Mounting	Dimension A-ITA (ISO)	
	Minimum	Maximum
Class II	14.94 in. (379.5 mm)	15.00 in. (381.0 mm)

Function, in sequence of location to the operator	Attachment movement	Motion of the operator's hand when actuating the truck auxiliary control handle while facing the load
Sideshift (when equipped)	Sideshift Right	Rearward or Up
	Sideshift Left	Forward or Down
Push/Pull *	Pull (rearward)	Rearward or Up
	Push (forward)	Forward or Down

* Trucks equipped with a three-function auxiliary control valve and solenoid adaption require the control knob electrical button to be depressed for operation of the push/pull function.

Section 2 Installation Instructions

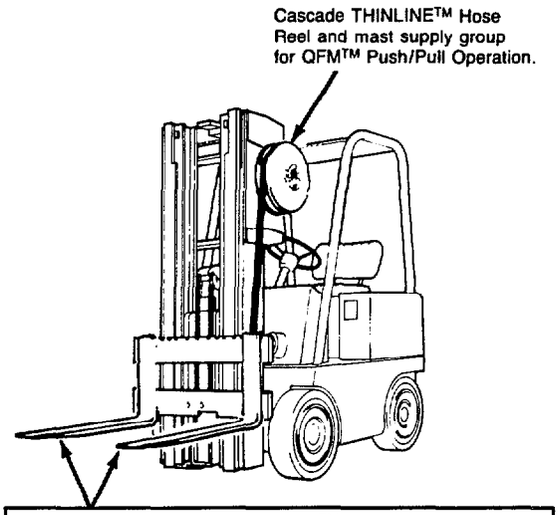
2.2 Installation

WARNING: Rated capacity of the truck/attachment combination is a responsibility of the original truck manufacturer and may be less than that shown on the attachment nameplate. Consult the truck nameplate.

2.2-1 Prior to Installation

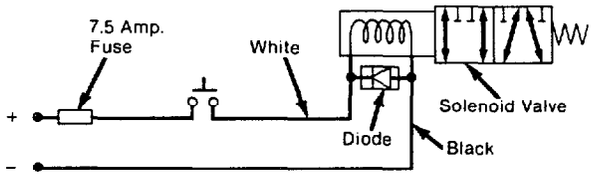
The following preparation should be performed prior to attachment installation.

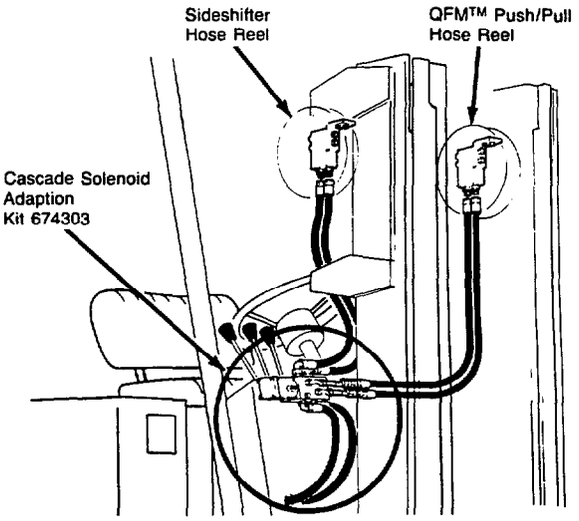
The QFM™ Push/Pull requires a mast hydraulic supply group. If a sideshifter is not installed and the truck is not equipped with mast internal hose reeving, a hose reel will be required. Refer to Form 673835 for THINLINE™ Hose Reel installation instructions.



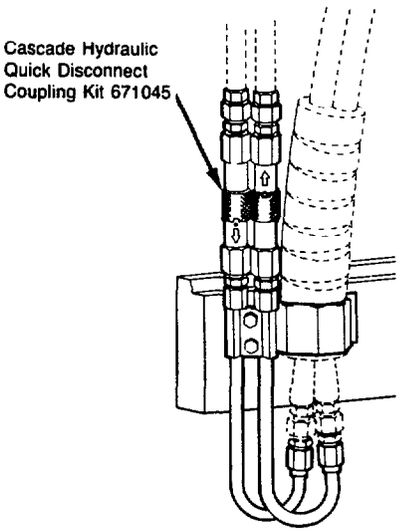
WARNING: The QFM™ Push/Pull must be mounted on standard forks to support the load and the attachment.

Trucks equipped with a sideshifter and a single-function auxiliary control valve will require conversion to two-function operation by installation of Solenoid Adaption Kit 674303. Refer to Form 674306 for installation instructions. Solenoid Adaption electrical schematic shown below.





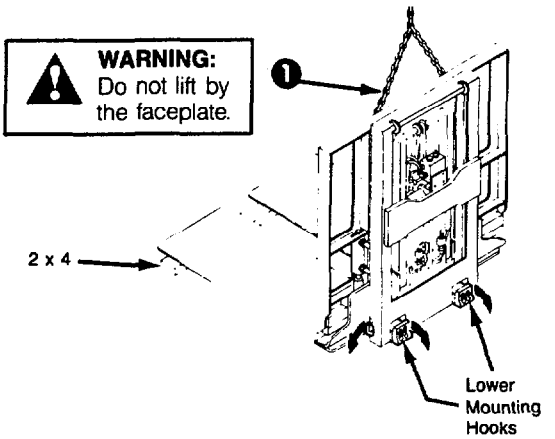
To utilize the attachment's Quick Mount features, installation of hydraulic quick disconnect couplers is required. Cascade Hydraulic Quick Disconnect Coupling Kit 671045 is recommended because of the couplers' hydraulic efficiency. Refer to Form 671422 for installation instructions.



Section 2 Installation Instructions

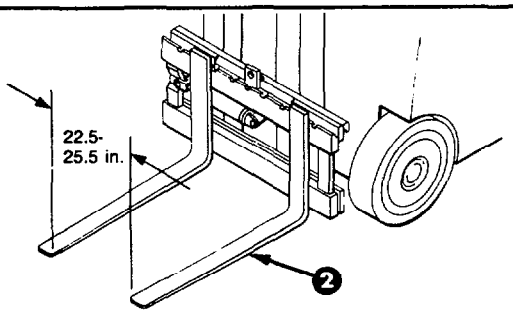
2.2-2 Initial Installation

WARNING: Do not lift by the faceplate.

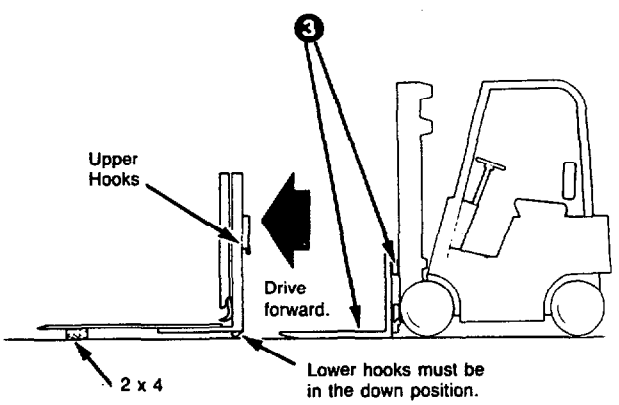


1. Attach a hoist rated at 2000 lbs. minimum through the frame and faceplate as shown. Remove the attachment from the shipping pallet. Pull out the lower mounting hook locking pins and turn the lower mounting hooks downward until they lock in position. Place the attachment on the floor with a 2 x 4 under the platen tips.

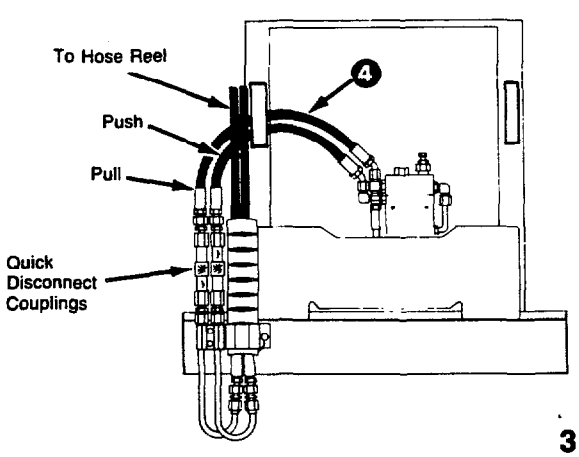
WARNING: The QFM™ Push/Pull must be mounted on standard forks to support the load and the attachment.



2. Adjust the truck forks to a measurement of 22.5-25.5 in. (57-64 cm) between the inner edges of the forks. Engage fork detent pins in appropriate notches.



3. Position the truck carriage in the true vertical position. Lower the forks to the ground. Center the truck carriage behind the attachment. Drive forward to **fully** engage the truck upper carriage bar with the attachment upper hooks. Raise the attachment 1-2 in. (2-5 cm).

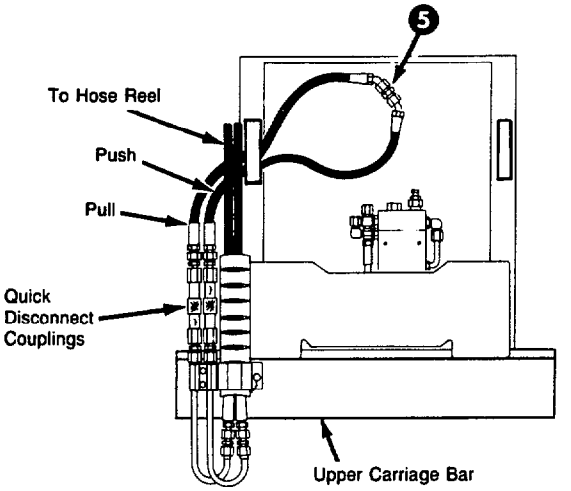


4. Connect the attachment hoses to the truck hose terminal fittings or Quick Disconnect fittings. Route the hoses to avoid interference with the mast.

   NOTE: Installation of Cascade Quick Disconnect Hydraulic Coupler Kit 671045 is recommended.

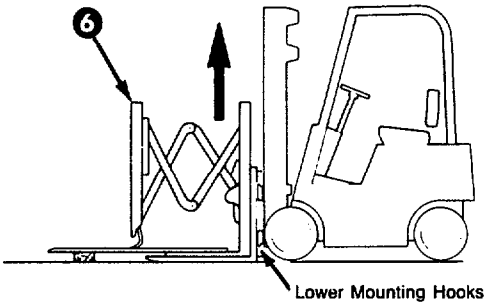
2.2-2 Initial Installation (cont.)

5 Disconnect the truck supply hoses from the attachment push/pull valve fittings. Connect the hoses together with a union fitting. Start the truck and actuate the truck control valve in both directions for about 30 seconds to carry any debris in the supply group to the truck tank and filter. On trucks equipped with solenoid adaption, the control knob electrical button must be pressed. Reinstall the hoses to the attachment.



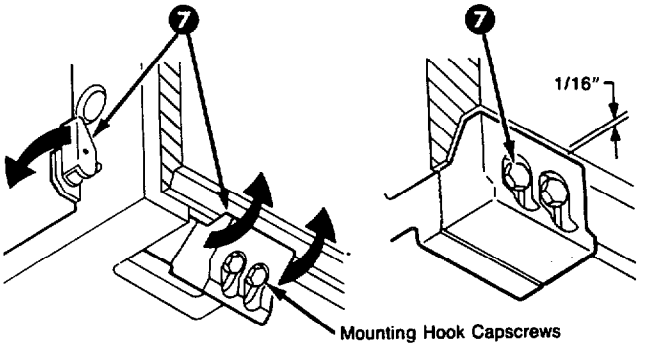
6 Actuate the push/pull control valve to position the faceplate out approximately 3/4 of its travel on the platen. Raise the attachment to eye level to gain access to the lower mounting hooks.

WARNING: The lower mounting hooks are not secured at this time. Use caution while working near the raised attachment.

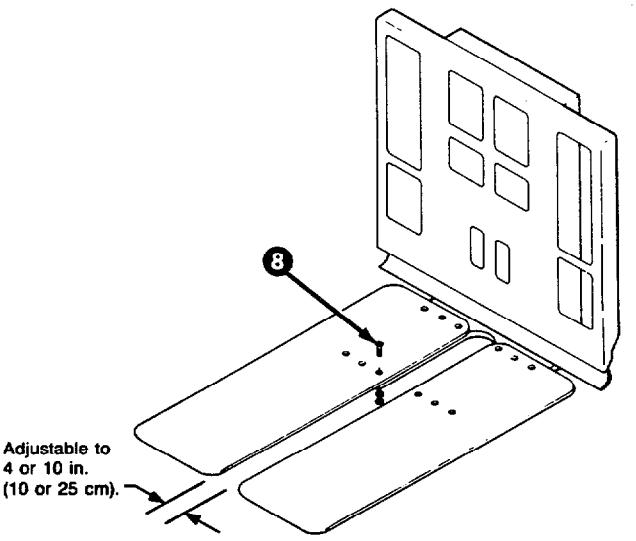


7 Loosen the mounting hook capscrews. Position hooks down to end of adjustment slot. Pull out the lower mounting hook locking pins. Rotate the hooks up and lock in place. Adjust the hooks for 1/16 in. (1.5 mm) clearance with the lower carriage bar. Tighten the capscrews to a torque of 55-65 ft.-lbs. (74-84 N·m). Make sure the hooks swing down and lock properly for attachment removal.

WARNING: The lower hooks must be firmly locked in the up position.



8 The inside spacing between the platens can be adjusted to 4 in. or 10 in. (10 or 25 cm) as required. Remove the platen capscrews and nuts. Move the platens to line up with the other set of predrilled holes. Install the capscrews and nuts. Tighten to a torque of 35-45 ft.-lbs. (47-60 N·m).



Section 2 Installation Instructions

2.3-3 Prior to Operation

1. Operate the attachment through several complete cycles to make sure all functions operate correctly.
   - Retract the faceplate and note that the gripper bar closes fully before the faceplate retracts.
   - Extend the faceplate and note that the gripper bar opens before the faceplate extends.
   - With the faceplate extended and the control valve in neutral, the gripper bar should not drift down.
2. Check for external leaks at the hoses and fittings.

Section 3 Periodic Maintenance

3.1 100-Hour Maintenance

Every time the lift truck is serviced or every 100 hours of truck operation, whichever comes first, complete the following maintenance procedures.

- ☐ Inspect the link rollers and related parts for sufficient lubrication. If necessary, lubricate with Dubois FGG-2 food industry grease, Cascade part no. 669306.
- ☐ Inspect the hoses mounted to the links. They should be mounted securely and without hose droop. Check for hose wear and kinking. Replace kinked or worn hoses. Refer to Section 5.2-3.

IMPORTANT

After completing any service procedure, always test each function through 5 complete cycles. First test the attachment empty, then test each function with a load to make sure the attachment operates correctly before returning it to the job.

3.2 500-Hour Maintenance

After each 500 hours of lift truck operation, in addition to the 100-hour maintenance procedures, perform the following procedures.

- ☐ Inspect all bushings and thrust races at the pivot points for excessive wear. Replace if necessary.
- ☐ Tighten the capscrews that secure the link pivot points to a torque of 20-30 ft.-lbs. (27-40 N·m).
- ☐ Inspect the bolts securing the gripper pad. Tighten if necessary to a torque of 15-20 ft.-lbs. (20-27 N·m).
- ☐ **WARNING:** Tighten the platen capscrews to a torque of 35-45 ft.-lbs. (47-60 N·m).
- ☐ Tighten the mounting hook capscrews to a torque of 55-65 ft.-lbs. (74-87 N·m).

3.3 1000-Hour Maintenance

After each 1000 hours of lift truck operation, in addition to the 100-hour and 500-hour maintenance procedures, perform the following procedure.

- ☐ Replace all arm bushings and thrust races.

Section 4 Troubleshooting

4.1 General Procedures

WARNING: Before servicing any hydraulic component, relieve pressure in the system. Fully extend the faceplate, turn the truck off, and open the truck auxiliary valves several times in both directions.

After completing any service procedure, always test the function through several cycles. First test the attachment empty, then test the attachment with a load to be sure it operates correctly before returning it to the job.

Stay clear of the load while testing. Do not raise the load more than 3 in. (75 mm) off the floor while testing.

4.1-1 Truck System Requirements

- The lift truck must supply sufficient hydraulic pressure to handle the heaviest load. PRESSURE MUST NOT EXCEED 2300 PSI (160 BAR).
- Hydraulic flow: 4-10 GPM (15 L/min-38 L/min).
- The truck hydraulic system must supply hydraulic oil to the attachment that meets the specifications shown in Section 6.1-1.

4.1-2 Tools Required

In addition to a normal selection of hand tools you will need:

- A pressure gauge capable of measuring pressure to 2500 psi (175 bar), Cascade part no. 671212.
- An inline flow meter capable of measuring hydraulic flow to 20 GPM (80 L/min), Cascade part no. 671447.

4.1-3 Get All the Facts Before You Begin Working on the Attachment

It is important that you gather all the facts regarding the problem before you begin service procedures. The best way is to talk with the operator. Ask for a complete description of the malfunction. The following guidelines will help you decide where to begin your troubleshooting procedures.

- Attachment will not pull load.
- Faceplate will not extend or retract.
- Faceplate operates slowly.
- Gripper bar will not lower or raise.
- Gripper bar is not sequenced with the push/pull function.
- Gripper bar will not hold the slip sheet when pulling load onto platens.

If you encounter one of these problems, refer to Section 4.3.

4.2 Plumbing

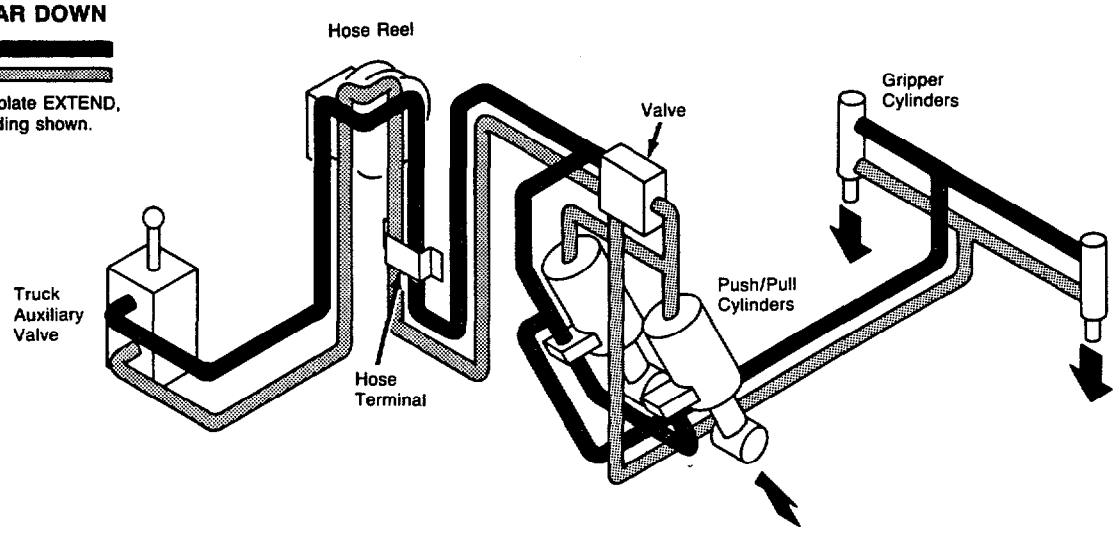
4.2-1 Hosing Diagram

FACEPLATE RETRACT AND GRIPPER BAR DOWN

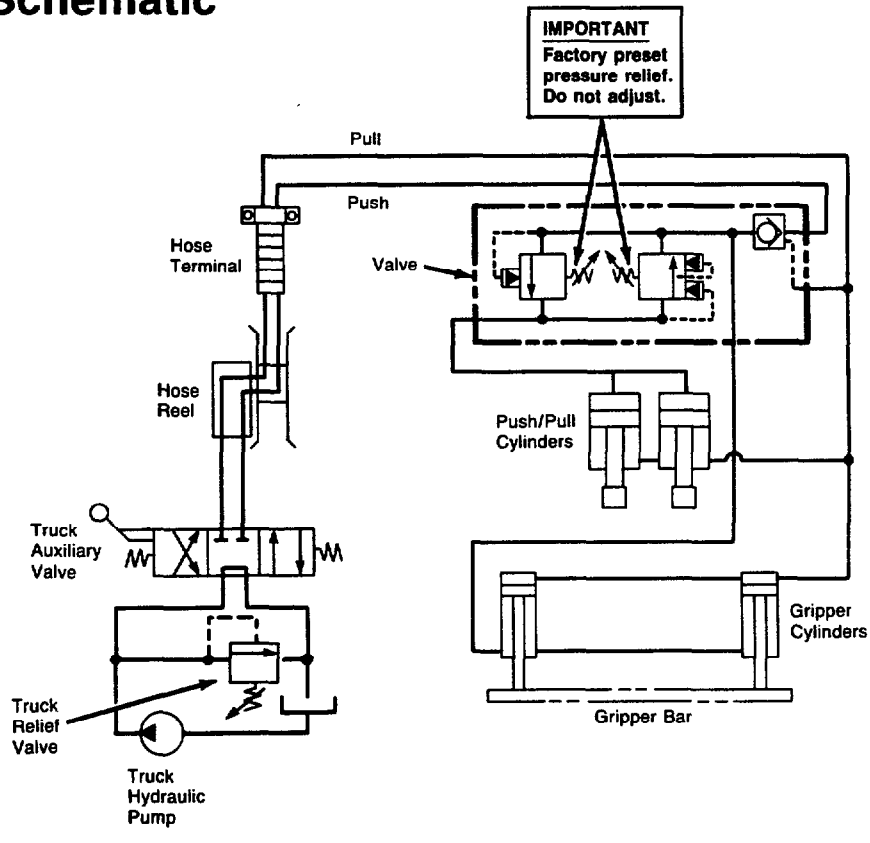
PRESSURE

RETURN

NOTE: For faceplate EXTEND, reverse the shading shown.



4.2-2 Circuit Schematic



Section 4 Troubleshooting

4.3 Push/Pull Circuit

There are five potential problems that could affect push/pull operation.

- Physically jammed mechanism
- Insufficient hydraulic flow and pressure
- Worn or defective cylinder seals
- Valve assembly malfunction
- Kinked supply hoses

Before proceeding, determine whether the push function or the pull function is at fault.

> **WARNING:** Before removing any hoses, relieve pressure that might be present in the hydraulic system. With the truck off, open the truck auxiliary control valve(s) several times in both directions.

1. Check the pressure delivered by the truck. Refer to the truck service manual. The pressure must be within 100 psi (7 bar) of specified truck pressure. TRUCK PRESSURE SHOULD BE 2000 PSI (138 BAR) MINIMUM AND 2300 PSI (160 BAR) MAXIMUM, measured at the hose terminal.
2. Check the flow volume at the hose terminal. See Section 6.1-1 for the recommended flow volumes.

PUSH FUNCTION

Gripper Bar will not raise —

- Physically jammed mechanism.
- Kinked hoses.

Gripper Bar drifts down —

- Valve assembly check valve stuck in open position due to contamination or damaged seals. Refer to Section 5.3-1.
- Damaged seals in gripper cylinder. Refer to Section 5.4.

Gripper Bar raises but faceplate does not extend —

- Valve assembly relief valve stuck in closed position due to contamination or damaged seals. Refer to Section 5.3-1.
- Valve assembly cartridge valve(s) factory set relief pressures have been altered. Replace the cartridges. Refer to Section 5.3-1.

Faceplate extends slowly —

- Worn seals in push/pull or gripper cylinders. Refer to Section 5.4.

PULL FUNCTION

Gripper Bar will not lower —

- Physically jammed gripper mechanism.
- Valve assembly check valve stuck in closed position due to contamination or damaged seals. Refer to Section 5.3-1.

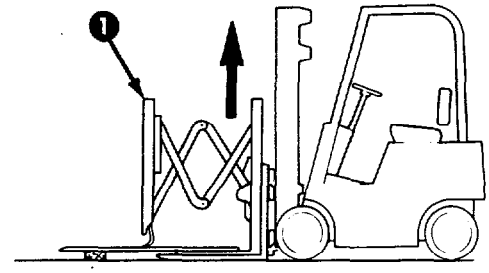
Gripper Bar lowers but faceplate does not retract —

- Valve assembly check valve stuck in closed position due to contamination or damaged seals. Refer to Section 5.3-1.
- Worn seals in push/pull cylinders. Refer to Section 5.4.

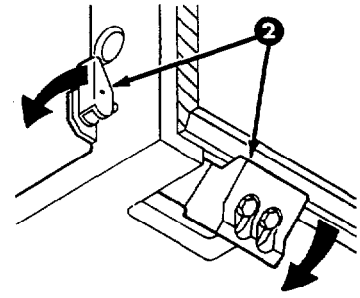
Gripper Bar does not hold slip sheet during faceplate retract —

- Worn seals in gripper cylinders. Refer to Section 5.4.
- Damaged gripper pad or jaw.

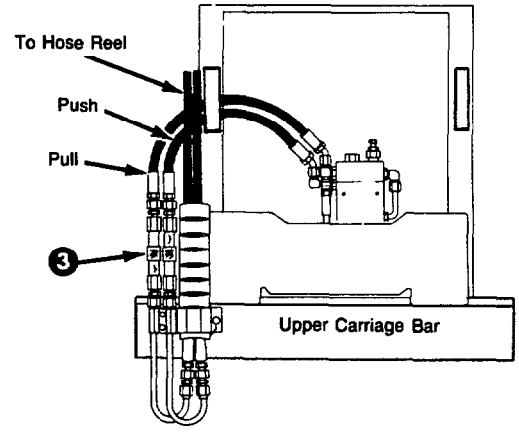
5.1 Attachment Removal and Installation



1. Extend the faceplate to approximately 3/4 of its travel on the platen. Position the attachment 2 ft. (60 cm) off the ground with the mast in the true vertical position.

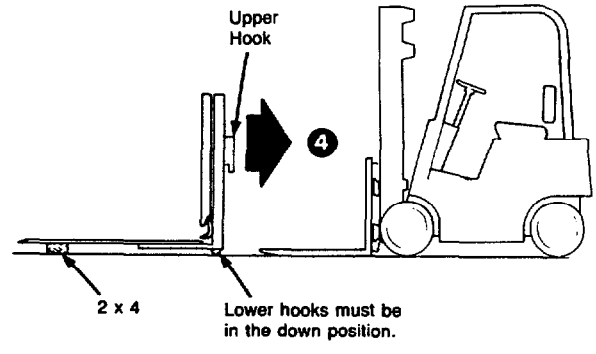


2. Pull out the lower hook locking pins. Swing the lower mounting hooks down and lock in the disengaged position.



3. Disconnect the quick disconnect hydraulic couplers at the truck carriage.

> **WARNING:** Before removing any hoses, relieve pressure that might be present in the hydraulic system. With the truck off, open the truck auxiliary control valve(s) several times in both directions.



4. Place a 2 x 4 (15 in. long) on the floor under the platen tips. Lower the attachment to the ground. Back the truck away from the attachment.

5. For installation, reverse the above procedures.

> **WARNING:** The QFM™ Push/Pull must be mounted on standard forks to support the load and the attachment.

5.2 Faceplate and Linkage

5.2-1 Disassembly and Reassembly

1. Fully extend the faceplate. Attach an overhead hoist chain to the top of the faceplate. Take up slack in the chain.

> **WARNING:** Before removing any hoses, relieve pressure that might be present in the hydraulic system. With the truck off, open the truck auxiliary control valve(s) several times in both directions.

2. Disconnect the hoses from the faceplate valve. Remove the hose clamps from the faceplate and links. For reassembly, tighten the hose clamp capscrews to a torque of 4-5 ft.-lbs. (5-7 N·m).

3. Remove the capscrews from the inner secondary link lower pivot pins. Remove the pivot pins. For reassembly, tighten the capscrew to a torque of 8-10 ft.-lbs. (10-13 N·m).

4. Remove the faceplate with the hoist. Tilt the faceplate to disengage the outer secondary link rollers from the faceplate channels. Set the faceplate face down.

5. Remove the capscrew from the left inner primary link at the cylinder rod end pivot point. For reassembly, tighten the capscrew to a torque of 6-7 ft.-lbs. (8-9 N·m).

6. Remove the cylinder rod end pivot pin.

7. Remove the roll pins from the inner primary link lower pivot pins. Remove the pivot pins.

8. Remove the linkage assembly from the frame by lifting with an overhead hoist. Tilt the linkage assembly to disengage the outer primary link rollers from the frame channels.

9. Remove the capscrews and caps from both inner primary/secondary link upper pivot points. For reassembly, tighten the capscrews to a torque of 20-30 ft.-lbs. (27-40 N·m).

10. Remove the upper pivot pin and hose guide tube. Note location of the thrust races during pivot pin removal.

11. Remove the capscrews and caps from the primary link center pivot points.

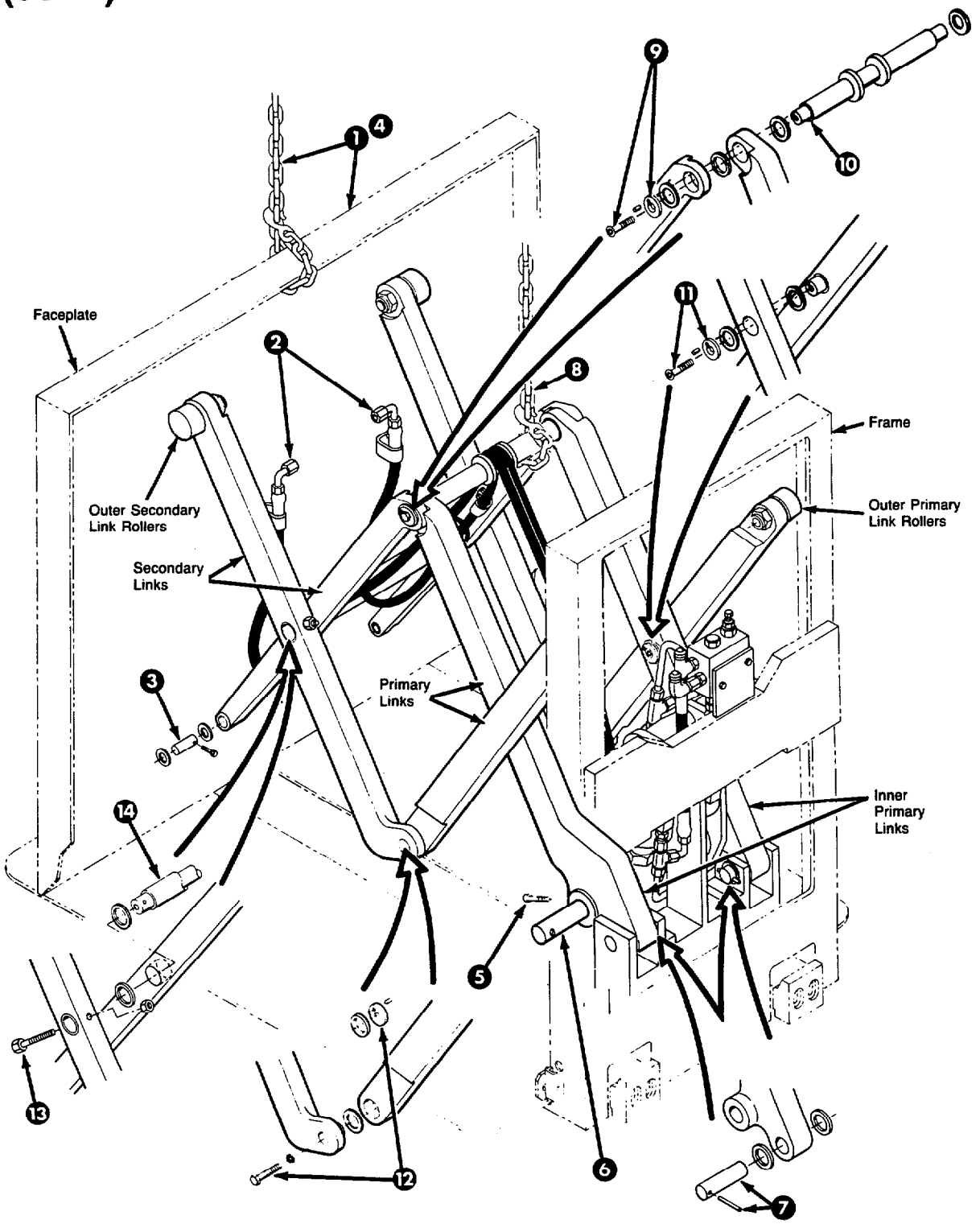
12. Remove the capscrews and caps from both outer primary/secondary link lower pivot points. For reassembly, tighten the capscrews to a torque of 20-30 ft.-lbs. (27-40 N·m).

13. Remove the capscrews from both outer secondary link center pivot points. For reassembly, tighten the capscrews to a torque of 6-7 ft.-lbs. (8-9 N·m).

14. Remove the center pivot pin and tube. Note location of the thrust races during pivot pin removal.

15. For reassembly, reverse the above procedures.

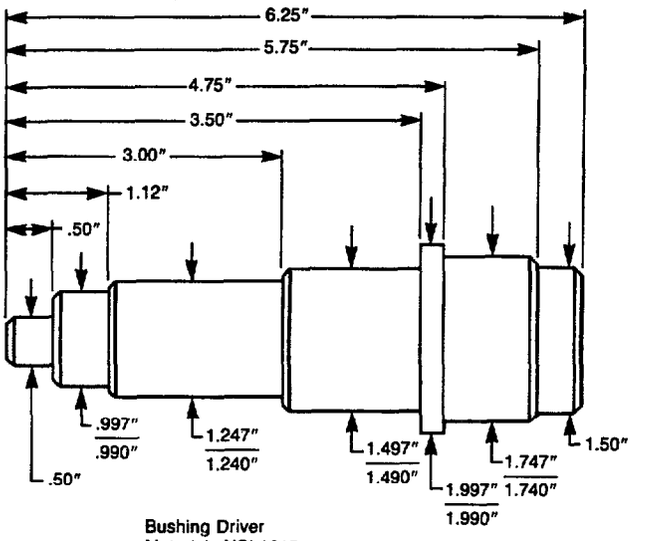
5.2-1 Disassembly and Reassembly (cont.)



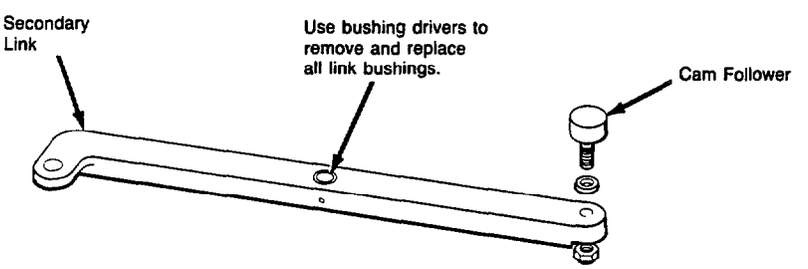
5.2-2 Link Service

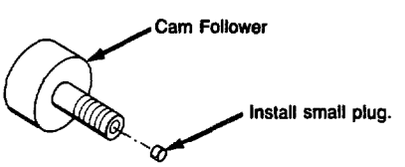
Remove the links from the attachment as described in Section 5.2-1.

1. Remove the bushings from the links using a bushing driver.
   - If you do not have bushing drivers, a tool as shown at right can be fabricated for bushing removal.
2. Inspect the cam followers for excessive wear or damage. If flat spots or cracks are visible on the cam followers, they should be replaced. Cam followers with roughness or noticeable restriction to turning should be replaced.
3. For reassembly, reverse the above procedures except as follows:
   - Bushing drivers **must** be used to press new bushings into the links.
   - If cam followers are being replaced, the nut should be tightened to a torque of 130-150 ft.-lbs. (175-200 N·m).
   - The small plug supplied with each replacement cam follower must be installed in the shaft end hole.



Bushing Driver
Material: AISI-1015
(Hot Roller Mild Steel)

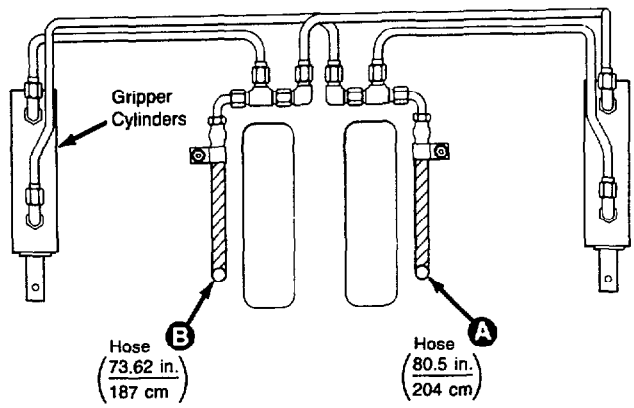




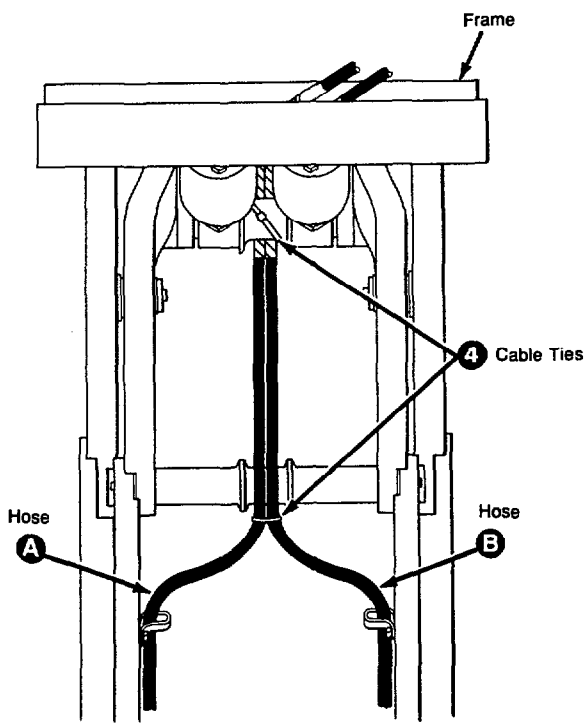
5.2-3 Hose Installation

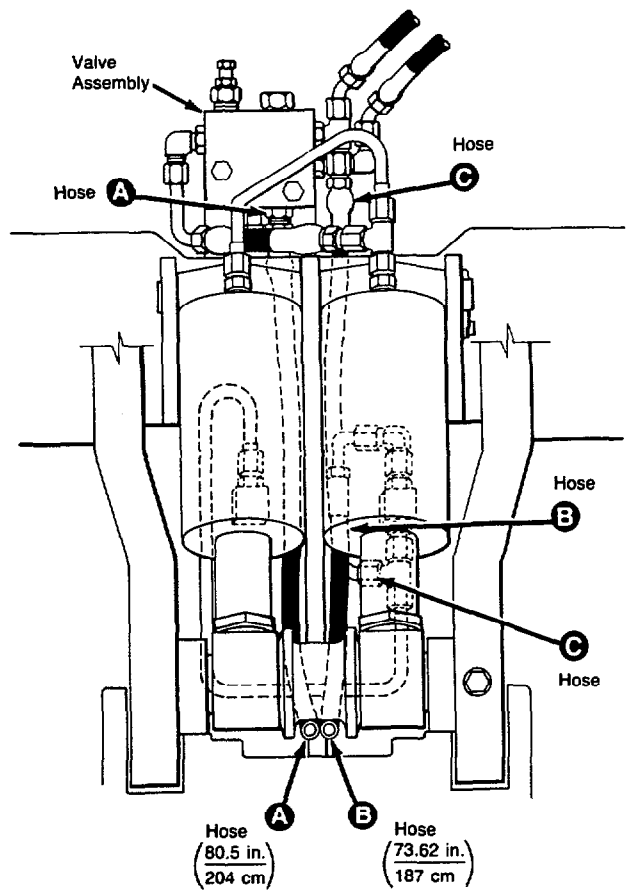
The attachment hoses must be installed as described below for correct hydraulic operation and tracking of the hoses with the arms during faceplate extension and retraction. Installing replacement hoses other than Cascade hose is not recommended.

1. Connect the hoses to the valve and push/pull cylinder.
2. Route hoses through the arms to the faceplate. Connect hoses to the gripper cylinder tubes as shown.
3. Install arm hose clamps to hose. Install hose clamp capscrews and tighten to a torque of 4-5 ft.-lbs. (5-7 N·m).
4. Arrange hoses as shown below. Install cable ties at the locations shown.



View from Driver's Seat





5.3 Valve

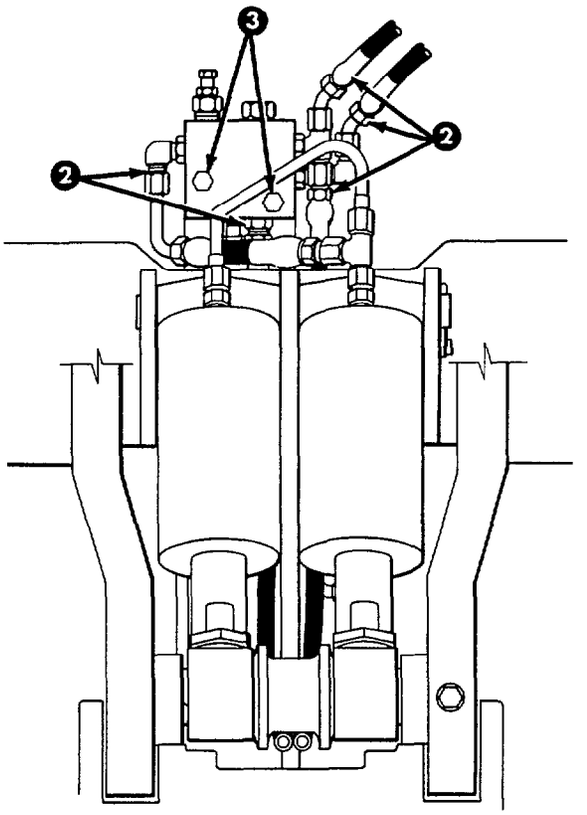
5.3-1 Removal and Installation

1. Fully extend the faceplate.

> **WARNING:** Before removing any hoses, relieve pressure in the hydraulic system. Turn the truck off, then open the truck auxiliary control valve(s) several times in both directions.

2. Disconnect, tag and plug the hoses from the valve fittings.

3. Remove the two capscrews and nuts securing the valve. For reassembly, tighten the capscrews to a torque of 4-5 ft.-lbs. (5-7 N·m).



5.3-2 Disassembly and Service

IMPORTANT: Service the valve in a clean work area.

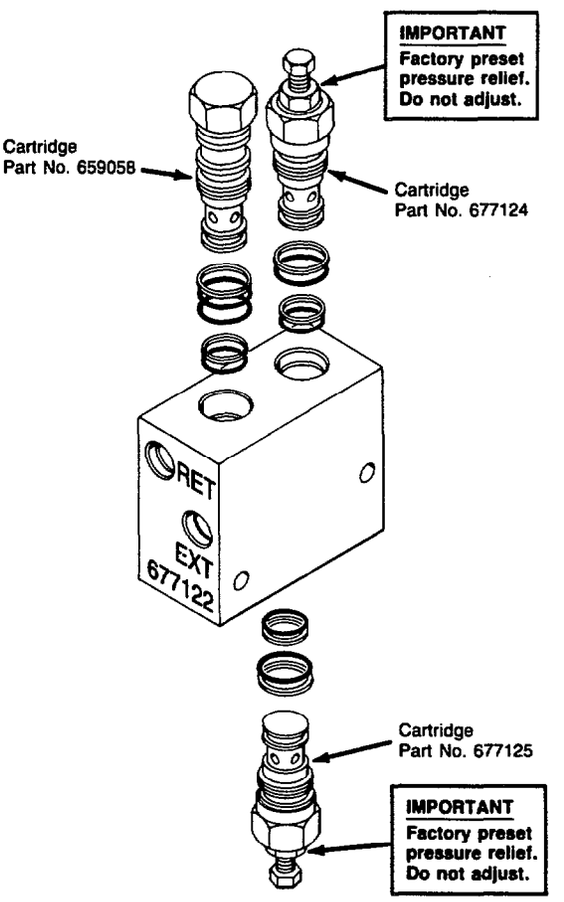
1. Remove the valve from the attachment as described in Section 5.3-1.

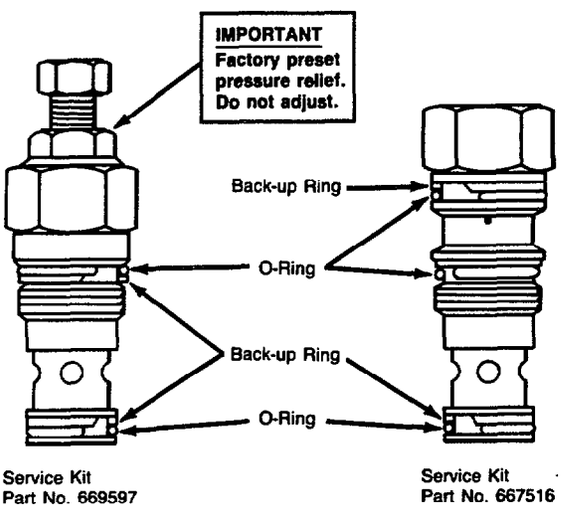
2. Remove fittings and plugs.

3. Remove the valve cartridges.

4. Clean all parts with kerosene or solvent. Check for contamination in pilot holes, etc.

5. For reassembly, reverse the above procedures except as follows:
   - Lubricate the check valve cartridges with STP or petroleum jelly prior to reassembly.
   - Tighten all fittings and cartridges to a torque of 10-15 ft.-lbs. (13-19 N·m).



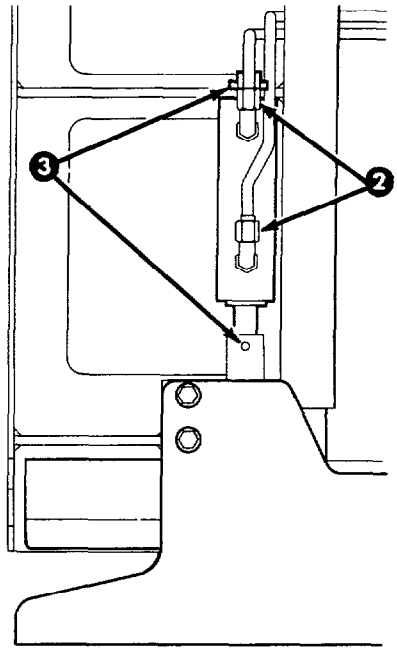


Service Kit Part No. 669597

Service Kit Part No. 667516

5.4 Cylinders

5.4-1 Gripper Cylinder Removal and Installation

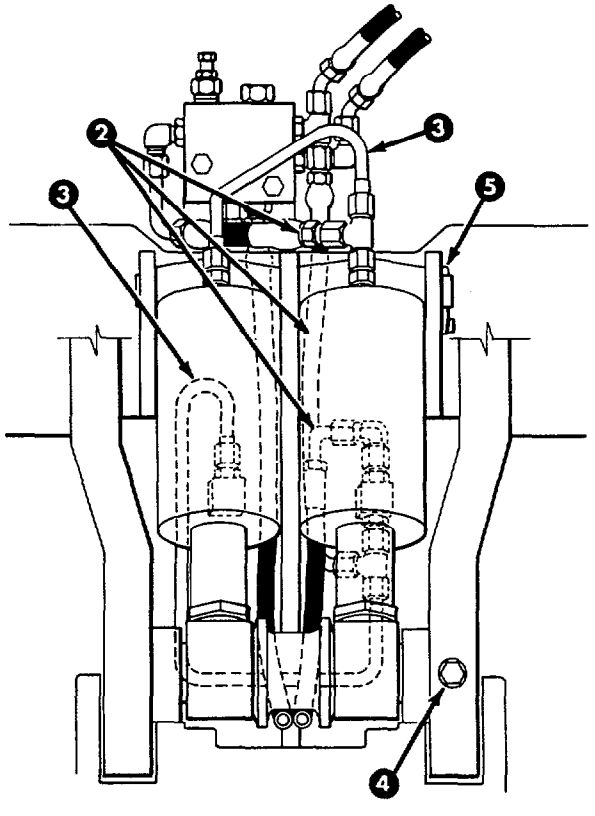


1. Fully extend the faceplate.

> **WARNING:** Before removing any tubes, relieve pressure that might be present in the hydraulic system. With the truck off, open the truck auxiliary control valve(s) several times in both directions.

2. Disconnect the tube fittings from the cylinder fittings.
3. Remove the cylinder anchor roll pins.
4. Installation is a reverse of the above procedures.

5.4-2 Push/Pull Cylinder Removal and Installation



1. Fully extend the faceplate.

> **WARNING:** Before removing any hoses, relieve pressure that might be present in the hydraulic system. With the truck off, open the truck auxiliary control valve(s) several times in both directions.

2. Disconnect, tag and plug the hoses shown from the cylinder fittings.
3. Disconnect the tubes from the cylinder fittings.
4. Remove the lower pivot pin retaining capscrew from the L.H. inner primary link. Remove the lower pivot pin. For reassembly, tighten the retaining capscrew to a torque of 6-7 ft.-lbs. (8-9 N·m). Mark the cylinders R.H. and L.H. for reassembly.
5. Remove the upper pivot pin retaining capscrew and eyebolt. Remove the upper pivot pin. For reassembly, tighten the capscrew to a torque of 4-5 ft.-lbs. (5-7 N·m).
6. After reassembly, adjust the cylinder rod length as described in Section 5.4-3.

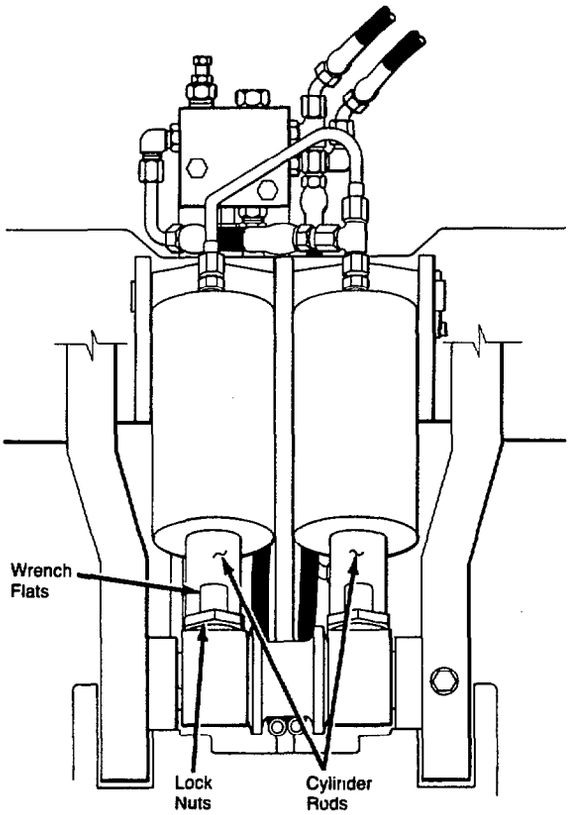
5.4-3 Push/Pull Cylinder Adjustment

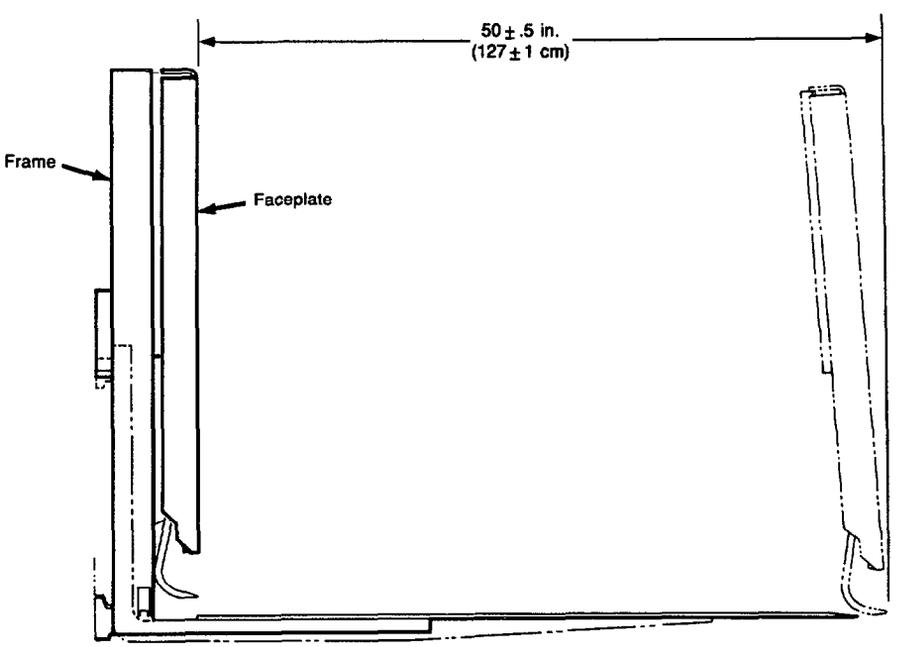
1. Position the faceplate 1 or 2 in. short of full extension. Turn the cylinder lock nuts clockwise to the end of their travel. Turn the cylinder rods, using the wrench flats, clockwise to the end of their travel.

2. Fully retract the faceplate.
   - The faceplate should retract smoothly without restriction or binding of the arms.
   - The push/pull cylinder should bottom internally as the faceplate makes initial contact with the frame. Adjust both cylinder rods equal amounts as required.
   - If the faceplate does not retract parallel with the frame, adjust one cylinder rod as required.

3. Fully extend the faceplate. The extension of the faceplate should be 50 ± .5 in. (127 ± 1 cm).

4. After all adjustments have been made, hold each cylinder rod in position and tighten the lock nuts against the rods to a torque of 100-150 ft.-lbs. (135-200 N·m).

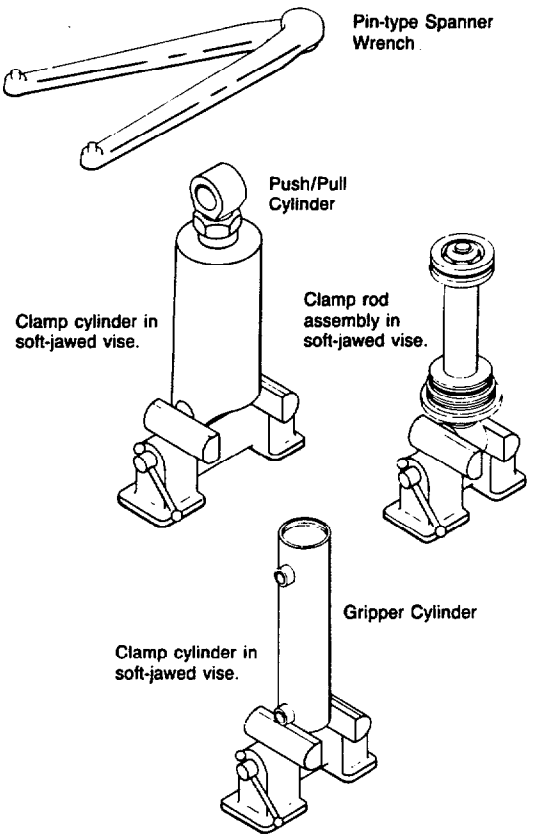




5.4-4 General Cylinder Service Procedures

Cylinder Disassembly

- Use a pin-type spanner wrench to remove push/pull cylinder retainers.
- When servicing a cylinder, clamp it in a soft-jawed vise as shown. **Never clamp the cylinder shell of the cylinder rod sealing area in a vise.**
- To remove the seal from a piston or a retainer, put the piston or retainer in a soft-jawed vise. Pry the seal up with a blunt tool such as a screwdriver, then cut the seal to remove it. **Be careful not to scratch the seal groove.**



Cylinder Inspection

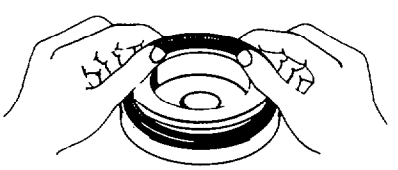
- Inspect the rod, piston and retainer for nicks and burrs. If deeply gouged, replace the part. Minor nicks and burrs can be removed with an emery cloth.

  NOTE: A minor nick is one that will not cause a bypass of oil when the cylinder is operating.
- Inspect the inside of the cylinder shell and remove any minor nicks and burrs with a butterfly hone. Replace the cylinder shell if it is deeply gouged.

Cylinder Reassembly

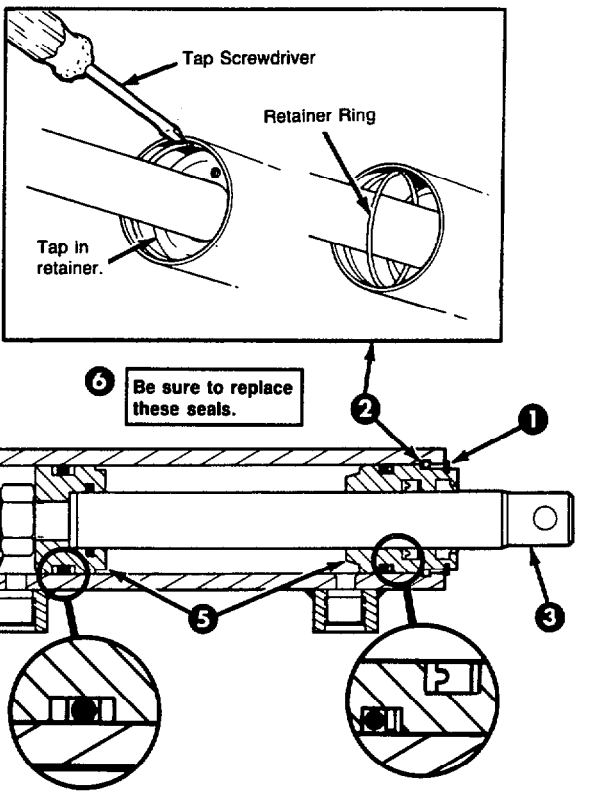
- Lubricate all new seals with STP before installing.
- To install a new seal on a piston or retainer, hook one side of the seal in the groove and push it over the piston or retainer.

  NOTE: Polishing the chamfer angle will allow the seal to slide into the groove much easier.
- Note the direction of U-cup seals. If they are installed backwards, the seals will not seal properly. Refer to the illustration of the cylinder you are servicing on page 18.
- Reassemble the rod assembly by sliding the retainer on first, then the piston assembly. Install and tighten the piston retaining nut before sliding the rod assembly into the shell.
- Observe all torque values as shown in the appropriate illustration.



Install new seals as shown.

5.4-5 Gripper Cylinder Service

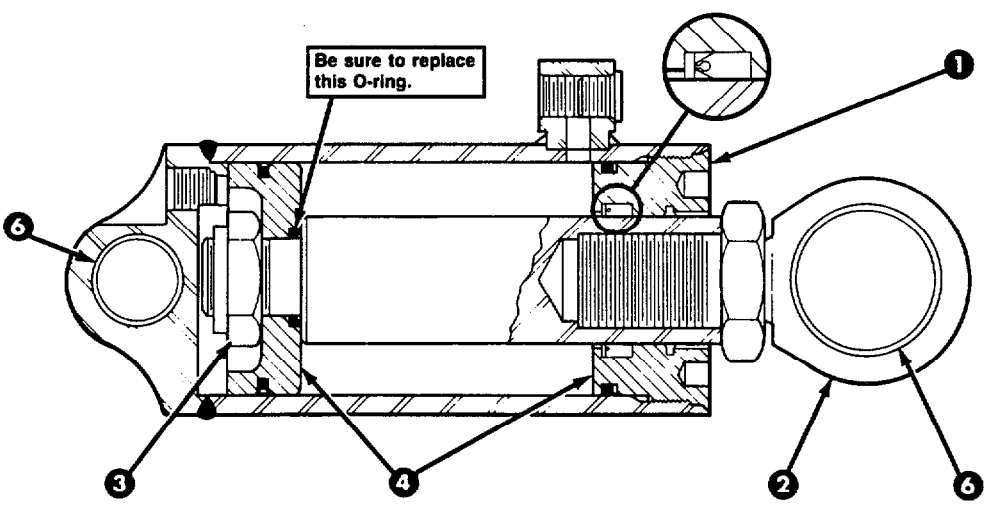


1. Remove the snap ring.
2. Remove the retainer ring by first tapping the retainer into the shell bore. Then place a screwdriver on one side of the ring and tap the screwdriver with a hammer. Do not gouge the shell bore with the screwdriver. The retainer ring should compress at the split and turn sideways as shown at right. Pull out the ring.
3. Pull the rod assembly out of the shell.
4. Remove the nut securing the piston to the rod. For reassembly, tighten the nut to a torque of 40-45 ft.-lbs. (54-61 N·m).
5. Slide the piston and retainer off the rod.
6. Remove and replace all seals.
7. Perform the inspection and reassembly procedures listed in Section 5.4-4.

5.4-6 Push/Pull Cylinder Service

Read the General Service Procedures, Section 5.4-4 before proceeding.

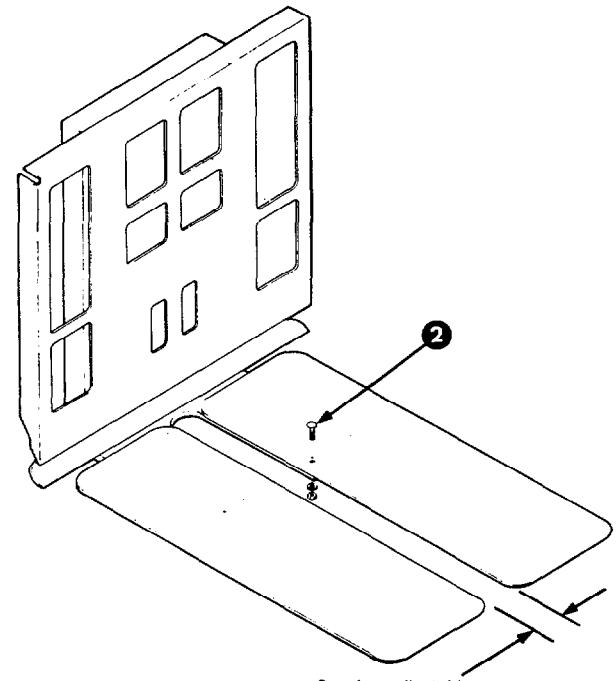
1. Use a pin-type spanner wrench to remove the retainer. For reassembly, tighten the retainer to a torque of 300-350 ft.-lbs. (405-475 N·m).
2. Pull the rod assembly out of the shell.
3. Remove the nut securing the piston to the rod.
4. Slide the piston and retainer from the rod.
5. Remove and replace all seals.
6. Remove and replace the cylinder rod and base end bushings.
   - If you do not have bushing drivers, a tool as shown in Section 5.2-2 can be fabricated for bushing removal.



5.5 Platens

5.5-1 Removal and Installation

1. Fully retract the faceplate. Lower the attachment to 1 ft. above the floor.
2. Remove the capscrews and nuts. For reassembly, tighten the capscrews to a torque of 35-45 ft.-lbs. (47-60 N·m).
3. Reassembly is a reverse of the above procedures except as follows:
   - The inside spacing between the platens can be adjusted to 4 in. (5.4 cm) or 10 in. (13.5 cm). Move the platens to line up with the other set of predrilled holes. Reinstall the capscrews and nuts.



5.5-2 Inspection

1. Check the platen tips for nicks. Flatten out nicks with a hammer and smooth the edges with a file or grinder.
2. An application of wax or paraffin on the top of the platens will reduce friction between the platens and slip sheets. Use steel wool to remove excess wax.

Section 6 Specifications

6.1-1 Hydraulics

Hydraulic Specifications	30D
Pressure—Maximum	2300 PSI (160 bar)
Flow—Minimum①	4 GPM (15 L/min)
Recommended	6 GPM (22 L/min)
Maximum②	10 GPM (37 L/min)
Supply Hose & Fitting Size Minimum Orifice Size	No. 6 3/8 in. (9.5 mm)

① Flow less than minimum will result in slow faceplate speed.
② Flow greater than maximum can result in excessive faceplate speed, reduced system performance and short hydraulic system life.

Hydraulic Oil—Cascade attachments are compatible with SAE 10 W petroleum base oil per Mil. Spec. MIL-0-5606 or MIL-L-2104B.

Use of synthetic or aqueous base hydraulic oil is not recommended. Contact Cascade if fire-resistant hydraulic oil must be used.

In order to conform to industry standard practice, the hoses should be connected to the truck auxiliary valve as indicated by the chart.

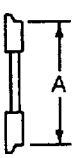
Function, in sequence of location to the operator	Attachment Movement	Motion of the operator's hand when actuating the truck auxiliary control handle while facing the load
Sideshift (when equipped)	Sideshift Right	Rearward or Up
	Sideshift Left	Forward or Down
Push/Pull *	Pull (rearward)	Rearward or Up
	Push (forward)	Forward or Down

* Trucks equipped with a single-function auxiliary control valve and solenoid adaption require the control knob electrical button to be depressed for operation of the push/pull function.

6.1-2 Truck Carriage

Truck carriage must conform to ISO dimensional standard 2328, equivalent to Industrial Truck Association (ITA) dimensions shown.

Make sure the truck carriage is clean and the notches are undamaged.

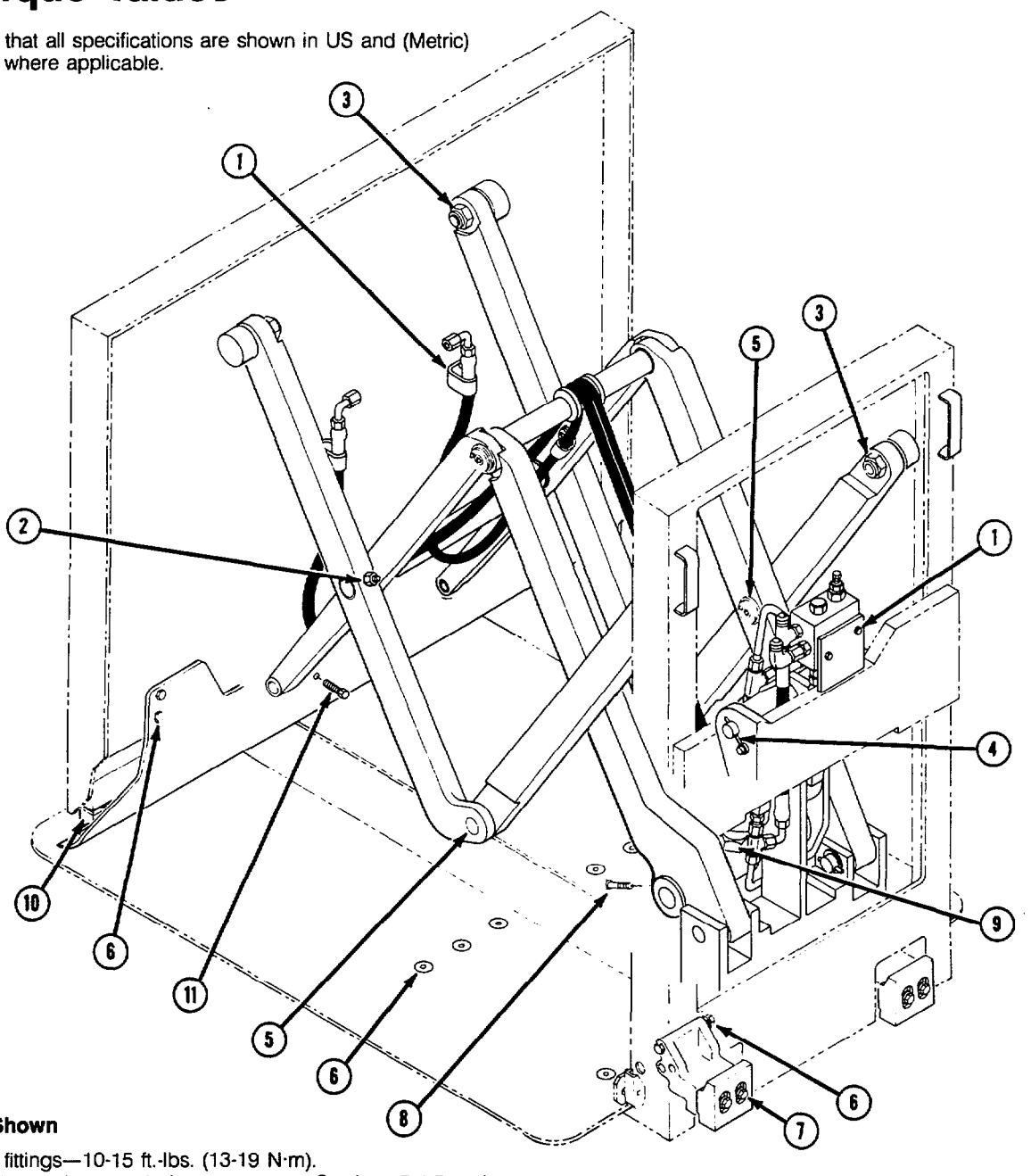


Mounting	Dimension A-ITA (ISO)	
	Minimum	Maximum
Class II	14.94 in. (379.5 mm)	15.00 in. (381.0 mm)

Section 6 Specifications

6.1-3 Torque Values

Note that all specifications are shown in US and (Metric) units where applicable.



Not Shown

Valve fittings—10-15 ft.-lbs. (13-19 N·m).
Cylinder retainers and piston nuts—see Sections 5.4-5 and 5.4-6.

Ref. No.	Fastener Thread Size	Torque Values	
		Ft.-Lbs.	(N·m)
1	1/4 NC	4-5	(5-7)
2	1/4 NC	6-7	(8-9)
3	7/8 NF	130-150	(175-200)
4	1/4 NC	4-5	(5-7)
5	3/8 NC	20-30	(27-40)
6	1/2 NC	35-45	(47-60)
7	1/2 NC	55-65	(74-87)
8	1/4 NC	6-7	(8-9)
9	1-1/4 NF	100-150	(135-200)
10	5/16 NC	15-20	(20-27)
11	5/16 NC	8-10	(10-13)

Do you have questions you need answered right now? Call your nearest Cascade Service Department.

AMERICAS

Cascade Corporation
U.S. Headquarters
2201 NE 201st
Fairview, OR 97024-9718
Tel: 800-CASCADE (227-2233)
Fax: 888-329-8207

Cascade Canada Inc.
5570 Timberlea Blvd.
Mississauga, Ontario
Canada L4W-4M6
Tel: 905-629-7777
Fax: 905-629-7785

Cascade do Brasil
Rua João Guerra, 134
Macuco, Santos - SP
Brasil 11015-130
Tel: 55-13-2105-8800
Fax: 55-13-2105-8899

EUROPE-AFRICA

Cascade Italia S.R.L.
European Headquarters
Via Dell'Artigianato 1
37030 Vago di Lavagno (VR)
Italy
Tel: 39-045-8989111
Fax: 39-045-8989160

Cascade (Africa) Pty. Ltd.
PO Box 625, Isando 1600
60A Steel Road
Sparton, Kempton Park
South Africa
Tel: 27-11-975-9240
Fax: 27-11-394-1147

ASIA-PACIFIC

Cascade Japan Ltd.
2-23, 2-Chome,
Kukuchi Nishimachi
Amagasaki, Hyogo
Japan, 661-0978
Tel: 81-6-6420-9771
Fax: 81-6-6420-9777

Cascade Korea
121B 9L Namdong Ind.
Complex, 691-8 Gojan-Dong
Namdong-Ku
Inchon, Korea
Tel: +82-32-821-2051
Fax: +82-32-821-2055

Cascade-Xiamen
No. 668 Yangguang Rd.
Xinyang Industrial Zone
Haicang, Xiamen City
Fujian Province
P.R. China 361026
Tel: 86-592-651-2500
Fax: 86-592-651-2571

Cascade India Material Handling Private Limited
No 34, Global Trade Centre
1/1 Rambaugh Colony
Lal Bahadur Shastri Road,
Navi Peth, Pune 411 030
(Maharashtra) India
Phone: +91 020 2432 5490
Fax: +91 020 2433 0881

Cascade Australia Pty. Ltd.
1445 Ipswich Road
Rocklea, QLD 4107
Australia
Tel: 1-800-227-223
Fax: +61 7 3373-7333

Cascade New Zealand
15 Ra Ora Drive
East Tamaki, Auckland
New Zealand
Tel: +64-9-273-9136
Fax: +64-9-273-9137

Sunstream Industries Pte. Ltd.
18 Tuas South Street 5
Singapore 637796
Tel: +65-6795-7555
Fax: +65-6863-1368

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